

# **2010 ESTIMATED COST OF PRODUCING HOPS IN THE YAKIMA VALLEY, WASHINGTON STATE**

**-producer version-**

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## **Introduction**

Commercial hop acreage in Washington State is located in the Yakima Valley. In 2008, with a value of \$263.8 million, hops ranked 9th in agricultural commodity value in Washington State. In 2009, 74.95 million pounds of hops from 29,588 acres were harvested in the state, accounting for 79% of the U.S. production. Washington hop acreage is expected to decline 30% in the next few years, a consequence of a worldwide oversupply. As a result, the economic climate for Washington hop producers is currently in chaos. In previous times, growers could generally count on putting in a trellis along with a drip irrigation system and leaving it in place for its useful life of approximately 20 years. This would assume that the grower would sign a 5-year contract, and renew it for 3 additional cycles on the same piece of ground (the variety might need to be changed and replanted, but the trellis and irrigation system would remain in service). However, things are currently so volatile that growers can no longer count on being able to amortize the cost of planting along with a new trellis and drip irrigation system over more than a few years. Under the current situation, some growers who thought they had a 5-year contract to amortize establishment costs are being asked to give up those contracts in as little as 2 years. Other growers may see their plantings and trellis and irrigation system remaining longer. In light of these circumstances, it is important to provide a tool for the estimation of establishment and production costs so hop growers can evaluate the profitability of their enterprise and make informed decisions regarding future plantings. There is also value in having this information for future contract and banking negotiations. Having an official document that lays out these expenses gives credibility to a grower who is trying to negotiate loan terms or contract amounts.

## **Objectives of Study**

The primary objectives of this study are:

1. To provide a representative estimate of capital requirements and production costs of a well-managed hop enterprise grown under drip irrigation.
2. To provide producers with a procedure and a tool for analyzing the profitability of their own hop enterprise.

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3. To develop an Excel workbook that has flexibility features that allows the user to easily make changes and/or additions to the existing data in the spreadsheets.

### **Sources of Information**

In putting together the general assumptions and the representative situation used in this study a committee of area producers identified the inputs, yields, and assumptions under which the budgets for the representative hop situation were developed. These producers are considered to represent well-managed hop farms. The quantities and types of materials (plants, fertilizers, herbicides, insecticides, etc.) used in the budgets were based on widely used practices.

Building and machinery costs were based on what the producer committee deemed typical of an average-sized hop farm in the Yakima Valley.

### **Basic Assumptions**

The following assumptions were the general assumptions made in developing the enterprise data for hops grown in the Yakima Valley:

1. The representative farm has 660 acres devoted to hop production with 600 acres in hops currently being established or currently producing. It takes 1.1 acres of land to establish 1 acre of hops. Thus, on this representative farm approximately 60 acres of extra land are needed for roads, buildings, picking equipment, etc.
2. Bare land is valued at \$4,500 per acre.
3. A drip irrigation system costs \$1,500 per acre to install. Annual repair and maintenance costs are \$15 per acre. The water charge is \$90 per acre.
4. Management is valued at \$400 per acre.
5. The prevailing interest rate is 6% for a short term loan, and 7.5% for a long-term loan.

### **Representative Situation**

The representative situation is a 40-acre hop field within the 660 acre farm that needs to be completely reestablished if production is to occur on this field. The producer has been offered a 4-year contract to establish and produce hops on this field. The producer desires to determine the price that must be received if all costs (financial and opportunity) are to be covered over a four year production period. The variety of hop to be grown is to be on a standard trellis and projected to have an average mature-year production of 2,600 lbs. First-year production is projected to be 80% of mature-year production, or 2,080 lbs.

## The Hop Production Cost Workbook (Excel)

The tables referred to in this documentation are located at the end of this documentation.

The Hop Production Cost Workbook is divided into two spreadsheets. The first spreadsheet, shown in Table 1, displays the establishment costs given the above general assumptions along with specific assumptions listed in the spreadsheet. The yellow cells are unprotected cells into which data or comments may be entered. The blue cells are protected cells that cannot be changed unless the spreadsheet is “unprotected.” To the right of the “colored” spreadsheet are “unprotected” white columns that may be used to provide “Your Costs” figures and comments that differ from that in the “colored” spreadsheet. Establishment costs include land preparation during the fall of the previous year, constructing the trellis system, planting the hop roots and installing the irrigation system. For the representative situation the establishment costs are estimated at \$5,873 per acre.

Table 2 presents the estimated production costs per acre during the first year and mature years for the representative situation. Production costs are classified into: *variable costs*, which are associated with materials, labor, consulting services and machinery operations; and *fixed costs*, which are incurred whether or not hops are grown and include equipment and building annual replacement cost (a proxy for depreciation), interest and taxes on investment, establishment, and management and administration costs.

Interest costs represent required return on investments. They can be actual interest payments on loans to finance the investment, or an opportunity cost (a return not received if the investment had been in an alternative activity), or a combination of the two. An opportunity cost of \$400 per acre for management is listed as a fixed cost rather than a variable cost because either one uses or loses management skills during the production year. The cost per acre is representative of what the producer committee felt was a fair return to their management. Amortized establishment costs are also included in the fixed costs. In this example, the amortized establishment costs comprise the planting costs amortized over 4 years based on the life of hop plants, and trellis and irrigation costs amortized over 4 years based on the assumed life of the trellis and irrigation systems. In both cases, a short term interest of 6% is used. These costs must be recaptured during the production years in order for an enterprise to be profitable.

In Table 2, the mature years per acre yield level was estimated at 2,600 pounds with the first year of production being 80% of that of the mature years. Given these production estimates the breakeven price of alpha hops for the first 4 year planting is estimated at \$3.18 per pound. The equation to estimate the breakeven price is as follows:

$$\text{Breakeven price} = \frac{TC_{Y1} + (TC_M * (H - 1))}{Q_{Y1} + (Q_M * (H - 1))},$$

where TC refers to the total cost of production; Q is hop yield ; H is the years of hop life; and the subscripts Y1 and M represent the first year of production and mature years (i.e., years 2 - 4), respectively.

Table 3 shows the amortization calculations used to determine the amount to be amortized over the expected years of life for the hop plants, and for the trellis and irrigation systems in Table 2.

### **Changing Spreadsheet Data**

Individual growers, and other users, may use the workbook WB\_represituation.xls that is available, along with a copy of this documentation at the USA Hops website: <http://www.usahops.org> – Statistics – Cost of Production.

Before changing any data in an existing workbook file, it is suggested that the workbook file be made “read-only” thus forcing the user to save the existing file and giving the new file a different name than that of the original file. To make a file “read-only”, the user needs to go to the folder where the file is stored and right-click on the filename, left-click on “Properties” and check “Read only.”

The accompanying workbook titled WB\_represituation.xls shows the data entries for the above mentioned representative situation. There are two ways by which data can be added and/or changed in this workbook. The most direct way is to change or add data directly using the yellow colored cells of the spreadsheet itself. The other way is to use the “Your Costs” columns and enter your costs separate from the original spreadsheet. If the “Your Costs” columns are used and the establishment costs change from their original values, the “Your Costs” amortization calculators may be used to calculate the new amortized establishment values.

One of the most costly activities in producing hops is the establishment costs. The longer the period these establishment costs can be amortized over the less expensive the cost of producing hops. If the user wants to change time periods and recalculate, simply change the years of hop life and the years of trellis and irrigation system life in the yellow cells on the original “production” spreadsheet. For instance, in the above representative situation, if the years of hop life are to be 5 years and the years of trellis and irrigation systems life are to be 10 years, the cost of producing the first planting drops from \$3.18 per pound to \$2.83 per pound.

For a detailed explanation as the flexibility of the Hop Production Workbook, go to the WSU IMPACT Center website — <http://www.impact.wsu.edu/IMPACTProjects.html>, and download and save the document “2010 Estimated Cost of Producing Hops in the Yakima Valley, Washington State (Detailed Version),” along with the accompanying workbook files.

**Table 1: Estimated per Acre Costs for Preparing and Establishing a Standard Trellis Hop Field under Drip Irrigation**

ESTIMATED COSTS PER ACRE FOR PREPARING AND ESTABLISHING A STANDARD TRELLIS HOP FIELD UNDER DRIP IRRIGATION			Your Costs	Comments
Comments and Notes			\$	
LAND PREPARATION:	\$	October-November of Previous Year		
Disc	22.00	Custom hire 1.1 acres @ \$20/acre		
Subsoil	35.00	Custom hire 1.1 acres @ \$31.80/acre		
Plow/Rototill	50.00	Custom hire 1.1 acres @ \$45.45/acre		
Cultipack/Sprtooth (2X)	34.00	Custom hire 1.1 acres @ \$15.45/acre each time		
Fumigate		Not a standard practice		
Interest	8.46	6% of land prep cost including overhead		
Total Land Preparation	149.46		0.00	
ESTABLISHMENT:				
Materials and Labor				
Field Poles	900.00	60 poles @ \$15.00/pole		
Anchor Poles	235.00	10 poles @ \$23.50/pole		
Anchor Holes	35.00	10 holes @ \$3.50/hole		
Anchor Material	200.00	10 holes @ \$20/hole		
Wire and Staples	630.00	2,100 lbs. of wire @ 30 cents/lb.		
Hop Roots	800.00	4,000 roots @ 20 cents/root		
Labor	900.00			
Management	200.00	10 hours @ \$20/hour		
Irrigation System	1500.00	Labor and materials		
Interest	324.00	6% of above establishment costs		
Total Establishment Cost	5724.00		0.00	
Total Land Preparation and Establishment Costs	5873.46		0.00	

NOTE: All machinery costs, other than custom hired, are included in Year 1 production costs.

**Table 2: Estimated per Acre Costs and Returns from Producing Standard Trellis Hops under Drip Irrigation**

ESTIMATED PER ACRE COSTS AND RETURNS FROM PRODUCING STANDARD TRELLIS HOPS UNDER DRIP IRRIGATION					Your Costs		Comments
	Year 1 \$	Mature Years \$	Comments and Notes		Year 1	Mature Years	
			4	years of hop life			
			4	years of trellis and irrigation life			
<b>Variable Costs:</b>							
Fertilizer & Leaf Feed	275.00	250.00		Includes line cleaner			
Chemicals	325.00	450.00		Includes herbicide, insecticide & fungicides			
Consulting and custom hire	20.00	20.00		Includes scouting			
Licenses, fees and dues	40.00	40.00		Assessments, dues licenses, inspection fees			
Parts and Repairs	400.00	400.00		Includes equipment, trellis, irrigation, facilities			
Fuel and Oil	200.00	200.00					
Supplies	150.00	150.00		Includes twine & clips, general supplies			
Packaging	57.20	71.50	\$5.50	per bale Burlap, plastic, pelletizing			
Kiln Fuel	145.60	182.00	\$14.00	per bale			
Utilities	90.00	90.00					
Hop Dryer & Baler	104.00	130.00	\$10.00	per bale			
Seasonal Labor	1600.00	1500.00		Includes benefits, employer taxes, etc.			
Interest	102.20	104.51		6% of above variable costs x 6/12 (6 months)			
<b>Total Variable Costs</b>	<b>3509.00</b>	<b>3588.01</b>			<b>0.00</b>	<b>0.00</b>	
<b>Fixed Costs:</b>							
Equipment & Building Annual Replacement Cost	500.00	500.00		\$300,000 per year for a 600-acre hop ranch with capital investments having a 5-10 year lifespan			
Interest on Mach. & Buildings	1000.00	1000.00		\$8 million @ 7.5% divided by 600 acres (picker, kiln, baler, shop, office @ \$6.5 million + equipment @ \$1.5 million)			
Insurance Cost (all farm insurance)	190.00	190.00					
<b>Amortized Establishment Costs:</b>							
Planting Costs	4 years, 6% 288.59	288.59	\$1,000	Hop roots plus \$200 labor			
Trellis & Irrig. Costs	4 years, 6% 1406.31	1406.31	\$4,873	Land prep & estab. - planting costs			
Land & Property Taxes	82.50	82.50		\$75 per acre x 1.1 acres			
Land Cost	330.00	330.00		(\$4,000 per acre x 1.1 acres) x 7.5%			
Irrigation Water	90.00	90.00					
Management & Administration	400.00	400.00					
<b>Total Fixed Costs</b>	<b>4287.40</b>	<b>4287.40</b>			<b>0.00</b>	<b>0.00</b>	
<b>TOTAL COSTS</b>	<b>7796.40</b>	<b>7875.40</b>			<b>0.00</b>	<b>0.00</b>	
Estimated Production Level (Lbs.)	2080.00	2600.00		Fill in the blank with your estimates			
Breakeven Price		3.18	4	years of hop life			

**Table 3: Amortization Calculators for Table 2**

**AMORTIZATION CALCULATORS**

<b>A. Establishment cost attributed to Planting</b>	
Dollar amount to be amortized:	\$1,000.00
Number of years:	4
Interest rate:	6.00%
Amortized amount per year:	-\$288.59

<b>B. Establishment cost attributed to Trellis &amp; Irrigation System</b>	
Dollar amount to be amortized:	\$4,873.00
Number of years:	4
Interest rate:	6.00%
Amortized amount per year:	-\$1,406.31

**AMORTIZATION CALCULATOR  
TO BE USED FOR  
"YOUR COST" COLUMNS**

Dollar amount to be amortized:	
Number of years:	
Interest rate:	
Amortized amount per year:	

Dollar amount to be amortized:	
Number of years:	
Interest rate:	
Amortized amount per year:	